We claim:

1. A transducer comprising:

a resonator comprised of a distal end and a pair of angled walls, the resonator having a length "s", with the distal end forming a face of the resonator in the shape of a rectangle having the length "s", the pair of angled walls extending along the length "s" and the resonator having a cross section that has the shape of a trapezoid, the trapezoid having a top side and a bottom side, with the top side being wider than the bottom side and the top side being parallel to the bottom side; and

an acoustic energy generating means for generating acoustic energy in the frequency range of 0.4 to 2.0 MHz, the pair of angled walls focusing the acoustic energy on the distal end.

2. The transducer of claim 1 wherein the resonator comprises a material selected from the group consisting of quartz, sapphire, silicon carbide, silicon nitride, ceramics, aluminum and stainless steel.

3. The transducer of claim 1 wherein the acoustic energy generating means comprises a piezoelectric crystal.

4. A transducer comprising:

a resonator having a cross section that has the shape of a trapezoid, the trapezoid having a top side and a bottom side, with the top side being wider than the bottom side and the top side being parallel to the bottom side; and

an acoustic energy generating means for generating acoustic energy in the frequency range of 0.4 to 2.0 MHz, the acoustic energy generating means being positioned adjacent to the top side.

5. The transducer of claim 4 wherein the resonator comprises a material selected from the group consisting of quartz, sapphire, silicon carbide, silicon nitride, ceramics, aluminum and stainless steel.

6. The transducer of claim 4 wherein the acoustic energy generating means comprises a piezoelectric crystal.

7. A transducer comprising:

a resonator having a cross section that has the shape of a trapezoid, the trapezoid having a proximal side and a distal side that are parallel, and a first side and a second side that are not parallel, the first side being separated from the second side by a width "w", the width "w" being greater along the proximal side than it is along the distal side, the resonator having a length "s" measured in a direction perpendicular to a plane containing the cross section, the resonator having a uniform shape along the entire length "s", the resonator also having a distal end and a proximal end, the distal end comprising a face of the resonator that extends along the entire length "s" and includes the distal side, and the proximal end comprising a face of the resonator the extends parallel to the distal end and includes the proximal side;

a piezoelectric crystal for generating acoustic energy in the frequency range of 0.4 to 2.0 MHz when power is applied to the piezoelectric crystal, the piezoelectric crystal being positioned adjacent to at least part of the proximal end; and

a bonding layer positioned between the piezoelectric crystal and the resonator for attaching the piezoelectric crystal to the resonator.

8. The transducer of claim 7 wherein the distal end comprises a rectangular face of the resonator.

9. The transducer of claim 7 wherein the bonding layer comprises a material selected from the group consisting of indium, tin, indium alloys, tin alloys and epoxy.

10. The transducer of claim 7 wherein the resonator comprises a material selected from the group consisting of quartz, sapphire, silicon carbide, silicon nitride, ceramics, aluminum and stainless steel.

11. The transducer of claim 7 wherein the piezoelectric crystal comprises lead zirconate titanate.

12. The transducer of claim 7 further comprising:

an adhesion layer positioned in contact with a surface of the resonator; and

a wetting layer positioned between the adhesion layer and the bonding layer for helping the bonding layer bond to the adhesion layer.

13. The transducer of claim 7 wherein the adhesion layer comprises chromium and the wetting layer comprises silver.

14. The transducer of claim 7 further comprising a combination layer positioned between the bonding layer and the resonator, the combination layer functioning at least to facilitate attachment of the bonding layer to the resonator.

15. The transducer of claim 14 wherein the combination layer comprises a silver emulsion.

16. The transducer of claim 7 further comprising:

an adhesion layer positioned in contact with a surface of the piezoelectric crystal; and

a wetting layer positioned between the adhesion layer and the bonding layer for helping the bonding layer bond to the adhesion layer.

17. The transducer of claim 16 wherein the adhesion layer comprises chromium.

18. The transducer of claim 16 wherein the wetting layer comprises silver.